



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOUTHEAST REGIONAL OFFICE

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DATE May 27, 2016

RE Plan Approval Application Review
Braskem America, Inc.
Marcus Hook Borough, Delaware County
Application No.: **23-0012C**
APS ID: 890017, AUTH ID: 1106345

On January 14, 2015, the Department of Environmental Protection (DEP) received a Plan Approval application (No. 23-0012C) from Braskem America, Inc. (Braskem) for the expansion (debottlenecking) of its existing polypropylene manufacturing plant located at 750 West 10th Street, in Marcus Hook Borough, Delaware County.

Facility Information

Braskem polypropylene manufacturing plant is a major facility for VOC emissions located in an ozone marginal nonattainment area, and PM2.5 nonattainment area.

The Standard Industrial Classification (SIC) Code for this plant is 2821 - Plastics Material and Synthetic Resins; and the North America Industrial Classification System (NAICS) Code is 325211 – Plastics Material and Resin Manufacturing.

Existing Source Information

The facility is designated into three (3) areas as follows:

- H-5 Area propylene unloading and storing (Source ID 107)
- Splitter Area propylene purification (Source ID 106)
- Polymer Units Area polypropylene production (Source IDs 101A, 101B, 102A, 102B, 103A, and 103B)

The H-5 Area includes refinery grade propylene (RGP) and polymer grade propylene (PGP) unloading from trucks and railcars, and RGP and PGP storage tanks. The VOC emissions from this area are either fugitives or controlled by a flare (Source ID C100) located in the State of Delaware, and owned and operated by Sunoco Partners Marketing and Terminals, LP (SPMT).

The Splitter Area includes RGP and PGP purification and preparation processes. The VOC emissions from this area are either fugitives or controlled by a flare (Source ID C100) located in the State of Delaware, and owned and operated by SPMT.

The Polymer Units Area includes two (2) identical polypropylene production lines Plant 1 and Plant 2. Each plant is divided into three (3) sources based on the emissions types. The following are the source names and IDs in Braskem's TVOP No. 23-00012:

Plant	Source Name (Source ID)	Emission types	Emission Limits
1	Three Storage Silos (101A)	Stack (S01)	37.10 TPY (VOC)
	Polypropylene MFG Sources (102A)	Flare (C02)	
	Fugitive Sources (103A)	Fugitives (Z01)	
2	Three Storage Silos (101B)	Stack (S02)	24.30 TPY (VOC)
	Polypropylene MFG Sources (102B)	Flare (C02)	
	Fugitive Sources (103B)	Fugitives (Z02)	

Plant 1 has a polypropylene production rate of 430 million pounds per year (215,000 tons per year), according to RACT Application No. OP-23-0012 submitted in August 1995.

Plant 2 is limited to 240,900 tons polypropylene production per year in the TVOP.

Project

The project is to increase polypropylene production rate to 68,000 lb/hr (297,840 tons per year) per plant.

To achieve the proposed production rate, the project will involve the modification of the feedstock unloading, splitter, polymerization plant operations, additional piping and fugitive components. The proposed changes that are related to air emission sources are detailed below:

In the H-5 Area, the project will

- Install one (1) refinery grade propylene (RGP) storage bullet (90,000 gallon tank)
- Install piping and fugitive components to:
 - Modify the polymer grade propylene (PGP) railcar unloading process;
 - Connect RGP and PGP feed headers in H-5 and Splitter areas
 - Transfer PGP from the H-5 Area directly to PGP treaters or dryers bypassing a portion of the Splitter area

In the Splitter Area, the project will:

- Re-tray the T-9 De-ethanizer Tower
- Install additional piping and fugitive components to
 - Tie into existing Inter Refinery Pipeline (IRPL) to feed RGP directly to the Splitter Area
 - Tie the polymers propane return line into the propane-propylene treating system and C3 Splitter
 - Install larger PGP transfer pumps.

In the Polymers Units Area, the project will:

- Update the melt pump sizes
- Install larger PGP pumps
- Install additional piping and fugitive components to:
 - Increase the size of the propylene charge pumps; and
 - Increase the capacity of the filters on the Propane Return line.

Railcar Cleaning Station:

In its original PA application, Braskem proposed to install a railcar cleaning station. However, on May 25, 2016, it decided to not construct this station due to financial restraints.

Emission Increases

From Steam Demand Increase

Braskem purchases steam from FPL Energy Marcus Hook (FPL), who operates under TVOP Nos. 23-00084 and 23-00089. The Braskem and FPL facilities are not aggregated for determination of Prevention of Significant Determination (PSD) and Non-attainment New Source Review (NNSR) as determined by DEP and EPA. After consulting with Ms. Gerallyn Duke, EPA Region III, the emission increases from steam demand aren't part of this project.

From Production Increase

The VOC emission increases from the project can be divided into three (3) types:

- Uncontrolled intermittent emissions
- Controlled continuous and intermittent emissions
- Fugitive emissions

The controlled continuous and intermittent emission increases are estimated based on the production rate increase and the flare destruction efficiencies of 98% or 99.5% dependent on which flare is used for controlling emissions.

The uncontrolled intermittent emission increases are from the silos (Source IDs 101A and 101B). The VOC emission rates are based on actual emissions and the percent of the production increase.

The fugitive emission increases are from the new leaking components. Braskem estimated the emission increases based on the numbers of new components, types of these components, and the leak percentages from Braskem past several years' LDAR data and inspections.

Baseline Actual Emissions Determination

Table 1 – Actual Production Rates

Date	Plant 1 Production	Plant 2 Production
	lbs/month	
14-Jan	26,782,850	27,358,750
14-Feb	28,242,300	18,931,600
14-Mar	22,481,550	35,197,400
14-Apr	30,135,769	27,983,460
14-May	29,363,643	32,119,550
14-Jun	27,306,788	30,629,500
14-Jul	33,575,953	26,304,850
14-Aug	29,154,600	32,362,550
14-Sep	30,401,877	30,269,650
14-Oct	35,533,134	38,750,700
14-Nov	29,495,600	35,073,500
14-Dec	36,058,000	33,213,100
15-Jan	31,659,658	27,772,300
15-Feb	24,439,207	20,533,550
15-Mar	15,688,400	22,496,400
15-Apr	36,443,312	34,603,000
15-May	34,274,600	34,901,731
15-Jun	31,407,908	29,022,900
15-Jul	35,731,218	32,528,200
15-Aug	32,672,185	40,965,300
15-Sep	33,174,419	38,331,736
15-Oct	33,926,825	37,498,850
15-Nov	33,286,404	40,592,823
15-Dec	33,389,450	37,962,310

Table 1 above shows the actual monthly production rates from January 2014 through December 2015. The highest production rates achieved were 36,443,312 lbs/month in April 2015 for Plant 1 and 40,965,300 lbs/month in August 2015 for Plant 2. The production rates that could have accommodated were 437,319,744 lbs/yr for Plant 1 and 491,583,600 lbs/yr for Plant 2. Table 2 below shows the production rate baselines and percent increases for both plants:

Table 2 – Production Rate Baselines

Plant	Production Rate (lbs/yr)				
	Current Limit	Could have accommodated	Baseline	Proposed Limit	Increase %
1	430,000,000	437,319,744	430,000,000	595,680,000	38.53
2	481,800,000	491,583,600	481,800,000	595,680,000	23.64

The emission increases from the project are summarized in Table 3. The emissions were estimated and calculated by Braskem, and verified by DEP. The emissions from the cooling towers are not affected as a result of the project, because there is no additional cooling water demand.

Table 3 - Emission Increases from the Project

Source ID	Sources	Emission Types	VOC	PM/PM10	NOx	CO	CO2e
107	RGP Storage Bullet	Maintenance Purges	0.02				
		Fugitives	0.49				
	PGP Unloading Compressors	Railcar System Depressurizations	0.12				
		Maintenance Purges	0.03				
		Fugitives	0.68				
		Truck System Depressurizations	0.44				
		Truck System Fugitive Emissions	0.11				
106	IRPL Connection	IRPL Meter Proving	0.01				
		Maintenance Purges	0.001				
		Fugitives	0.57				
	PGP Product Transfer Pumps	Maintenance Purges	9.7E-05				
		Fugitives	0.14				
	Dryers	Incremental Dryer Regeneration	0.08				
Polymer Plants	Propylene Charge Pumps (both plants)	Maintenance Purges	1.12E-4				
		Fugitives	0.16				
	Propane Return Line Filter Changing	Plant 1	0.05				
		Plant 2	0.05				
	Polymers Units Baghouses	Plant 1		2.49/2.49			
		Plant 2		4.84/4.84			
	Propylene Degassing Column	Plant 1	0.25				
		Plant 2	0.03				
	Propylene Dryer Regenerations	Plant 1	0.21				
		Plant 2	0.26				
	Product Purge Bin Purging	Plant 1	0.76				
		Plant 2	0.45				
	Storage Silos Purging	Plant 1	0.70	0.21/0.21			
		Plant 2	0.45	0.15/0.15			
C02*			0.52		0.81	3.67	34,631
Project Total Emission Increases			6.58	7.68/7.68	0.81	3.67	34,631

*: Emissions from natural gas combustion only.

Regulatory Review

1. PSD

The project is not subject to the prevention of significant deterioration (PSD), because the project itself does not create significant emission increase (SEI) for attainment area pollutants as shown in Table 4.

Table 4 – PSD Step 1 Analysis

Pollutants	NO _x	SO ₂	CO	PM	PM	H ₂ SO ₄	Lead	CO _{2e}
Increases	0.8	0	3.8	7.9	7.9	0	0	35,915
PSD Significant Level	40	40	100	25	15	7	0.6	75,000
PSD Triggered	No	No	No	No	No	No	No	No

2. NSR – 25 Pa. Code Chapter 127 Subchapter E

- 25 Pa. Code 127.201(d) – Significant Emission Increases for VOC and NO_x**

As per 25 Pa. Code §127.201(d), this project is not subject to New Source Review (NSR), because the net NO_x and VOC emission increases from the project are not significant as determined in accordance with 25 Pa. Code §127.203a(a) (relating to applicability determination. Table 5 shows the emission aggregations in accordance with 25 Pa. Code §127.203a(a)(5).

Table 5 – VOC and NO_x Emission Aggregations

PA/RFD	Project Description	Date	Emission (TPY)	
			VOC	NO _x
Exemption	Cooling Tower Emission Factor Revision	01/30/2008	1.80	0.00
RFD-495	Propylene Dryers Regeneration Venting	07/15/2008	0.03	0.00
PA-23-0012A	RTO Decommissioning	01/14/2010	4.64	0.00
RFD-3191	Propane Loadout Rack	11/02/2012	0.85	0.00
RFD-3275	Propane Return & H-5 Jumpover	11/02/2012	0.73	0.00
RFD-3276	Moleseive Dryer Recovery	11/02/2012	0.22	0.00
RFD-3309	H-5 Railcar Heel Reduction (Phase 1)	11/14/2012	0.24	0.00
RFD-3187	P-Tank Retrofit	12/05/2012	0.33	0.00
RFD-3706	H-5 Railcar Safety Improvement	06/03/2013	0.47	0.00
RFD-2846	H-5 Railcar Heel Reduction (Phase 2)	08/07/2013	1.65	0.00
RFD-4348	Splitter Sulfur Treatment	04/18/2014	0.59	0.00
RFD-4496	Cooling Tower Optimization	06/13/2014	2.67	0.00
RFD-4912	Splitter #1 Isolation	01/16/2015	0.00	0.00
RFD-5243	Splitter Sulfur Treatment Expansion	08/19/2015	1.53	0.00
23-0012C	Polypropylene Production Expansion	01/14/2016	6.58	0.76
Emission Aggregation (10 Years)			22.33	0.76

- **25 Pa. Code 127.201 – Significant Emission Increases for PM2.5**

The PM2.5 emission increase from the project is below the significant level of 10 TPY. Therefore, the project is not subject to NNSR for PM2.5.

3. NSPS

The facility is subject to 40 CFR 60 Subpart DDD - Standards of Performance for Volatile Organic Compound (VOC) Emissions from the Polymer Manufacturing Industry, except the silos (Source IDs 101A and 101B) for the final product. The silos are not subject to the provisions of Subpart DDD, because:

- Plant I “commenced” construction before January 10, 1989, as per 40 CFR §60.560(b)(1)(i) and (ii).
- Plant II emits continuous emissions with a weight percent TOC of less than 0.10 percent, as per 40 CFR §60.560(g). However, the source is required to conduct a test as per 40 CFR §60.564(a)(1) and (d).

Braskem stated in an email dated May 10, 2016 that there were no planned physical changes and thus no capital expenditure planned for the Source ID 101A – Plant 1 Three Storage Silos. As per 40 CFR §60.14(e)(2), this production rate increase without expenditure is not considered as “modification”.

As per 40 CFR §60.564(a)(1), “Whenever changes are made in production capacity, each owner or operator shall conduct a performance test according to the procedures in this section as appropriate, in order to determine compliance with §60.562-1”.

- Braskem is required to conduct a test for Plant 2 silos (Source ID 101B) in order to determine compliance with the TOC weight percent limit of 0.10 percent.
- Braskem is required to conduct a test of the flair (Source ID C01) to demonstrate compliance with 40 CFR §60.18.

The other applicable requirements of 40 CFR 60 Subpart DDD are stated in the current TVOP No. 23-00012. Braskem is required to comply with the requirements that are already specified in TVOP No. 23-00012.

4. CAM

40 C.F.R. PART 64 - COMPLIANCE ASSURANCE MONITORING

CAM does not apply, because the emissions are controlled by the flares that do not have an emission standard.

5. 25 Pa. Code

§127.12(a)(5) – Best Available Technology (BAT)

The project will comply with the provisions of 40 CFR 60 Subpart DDD for VOC emissions, which is considered as BAT for the source category.

§127.44 – Public Notice

Notice of intent to issue this Plan Approval will be published in PA Bulletin and local newspaper. To be updated.

Recommendation

To be updated.

Summary of Plan Approval No. 23-0012C:

Event	Regulations	Date	Comments
Submittal of Application	NSPS - DDD BAT	Received on 1/14/2016	
Coordination	No		
Acceptance of a complete application		2/2/2016	
Publication in PA Bulletin	Required	5/28/2016	
Publication in local newspaper	Required	To be updated	
Comments from public received			
Comments from U.S. EPA Received			